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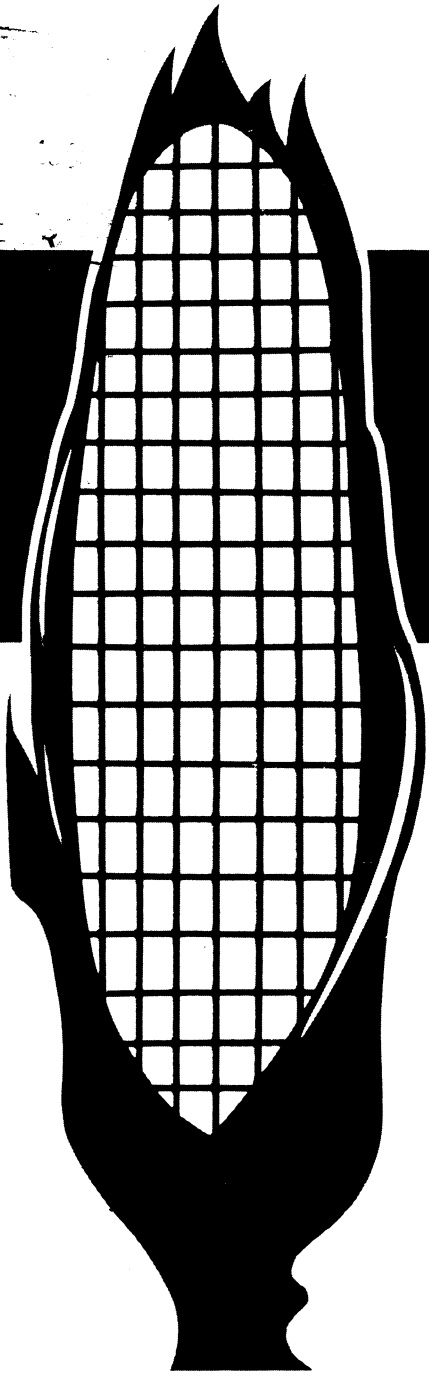

COMMERCIAL GROWING OF SWEET CORN

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COMMERCIAL GROWING OF SWEET CORN

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Sweet corn is grown commercially in more than 30 States. Growers have two outlets for their product—processing plants and the fresh market. Requirements for growing high-yielding, high-quality crops for both outlets are practically the same.

ADAPTATION

Temperature

General requirements

Sweet corn is essentially a warm-weather crop. It is easily killed by frost and may be seriously injured by prolonged cool temperatures several degrees above freezing. Germination and emergence of the seedlings are delayed, and may be prevented, by soil temperature below 50° F.

Few sweet corn varieties can be grown satisfactorily where the midsummer mean temperatures is below 65° F.

Most of the sweet corn for processing is grown in areas having mean temperatures of 65° to 70° F. during June, July, and August. Most of the acreage is in the eastern half of the country and north of a line through Indianapolis and Baltimore.

Where it is grown in the South or the West, sweet corn is planted at such time that it will be exposed to a mean temperature of 65° to 75° F. during most of its growth.

Temperature effect on growth

Midsummer weather in the South and Southwest is often hot and dry enough to interfere with or greatly reduce pollination. Hot, dry winds may damage the pollen or the entire tassel so that little or no normal pollen is available to produce a set of seed. Sweet corn varieties and hybrids differ in their tolerance of heat; some are better adapted to high-temperature conditions than others.

Varietal descriptions usually include a figure that indicates the number of days from planting to harvest. The figure is an approximate one for the variety in the area in which it is adapted and under normal growing conditions. The variety will develop faster at temperatures above average and slower at temperatures below average.

When successive plantings of a single variety are made in the spring, the later plantings develop faster than the early ones because of the warmer weather later in the

season. As a result, the range of harvest dates will be much shorter than the range of planting dates—that is, the number of days between harvests will be less than the number of days between plantings. Plantings made late in the season may make part of their growth in cooler weather, and the time required to reach harvest stage will be increased instead of decreased.

If temperatures either too cool or too hot prevent a planting from reaching harvest stage in about the time normally required, yield is likely to be impaired.

Corn earworm damage is much more serious in warm climates than in cool climates. In the southern part of the country, successively later plantings usually suffer increasingly serious damage from the earworm. Late plantings may become virtually worthless unless insecticides are used.

Temperature effect on quality

At the best stage for eating, sweet corn kernels contain 5 to 6 percent of sugar, 10 to 11 percent of starch, and 70 percent of water. As the ear continues to mature beyond that stage, sugar content decreases, starch content increases, and the seedcoats thicken and toughen.

Temperature has no significant effect on the maximum level of sugar content that will develop in the kernels, but it greatly affects the time that the kernels remain sweet and the seedcoats tender. The ears mature faster in hot weather than in cool weather and remain in prime condition for eating for a shorter time. They may pass the best eating stage quickly, which increases the chance of harvesting ears that are too mature. The quality deteriorates quickly after harvest if the ears are not kept cool.

The temperature effect on rate of development and maturity is relatively precise and definite. In fact, by use of instruments and data on variety growth and temperature requirements, experienced growers are able to predict days in advance the best date to harvest for maximum quality.

Rainfall

In nonirrigated areas of the United States sweet corn is grown chiefly where the rainfall from April through September is 20 inches or more and is fairly well distributed, and the annual rainfall is 30 inches or more. Annual rainfall in the extensive sweet corn districts in southern Minnesota is only 25 to 30 inches, but the rainfall from April through September averages 21 to 24 inches.

Unless the soil can retain a large supply of water, sweet corn suffers from lack of moisture if rainless periods last more than 2 weeks. In the southern part of the country, after the tassels show, the plants need rain or irrigation every week. In the so-called dryland farming areas sweet corn is an uncertain crop, and it either partially or completely fails in 7 or 8 years out of 25.

An average seasonal rainfall of 10 to 12 inches or an annual rainfall of no more than 15 to 20 inches

is clearly insufficient for profitable sweet corn crops year after year, even with the use of the best dryland farming methods.

Day Length

Sweet corn varieties and hybrids differ in the way their growth is affected by day length. Small early varieties developed for the North generally are not recommended for the South, even for growing during cool seasons. Adapted to the long, cool summer days in the North, they do not make satisfactory growth during the short spring or autumn days in the South. Also, the earliest kinds are smaller than desired for shipping from the South.

Certain distinctly southern types, such as Honey June and a tropical variety, USDA 34, are adapted to relatively short days as well as to high temperature. When planted in the North, they may not silk and tassel until they grow to a height of 8 to 10 feet—when it is too late for them to produce edible corn before frost. They may fail, although it appears the growing season is long enough.

Soil

A deep, naturally rich, easily worked soil is preferred for growing sweet corn. However, the corn can be grown successfully on any well-drained soil that produces good yields of other crops or a heavy growth of annual weeds.

Sweet corn is not especially sensitive to soil acidity. But if the soil is extremely acid, enough lime should be applied to make it only moderately acid. County agricultural agents can furnish instructions regarding soil lime-requirement tests.

A field of sweet corn on flat, sandy land drained by ditches.

Sweet corn for early market should be planted on rather loose, light soil that warms up early in the spring. These features are not important for growing corn for later market or for processing, except where the season is short.

Soils subject to wind erosion should be protected by windbreaks.

VARIETIES

Superior hybrids have largely replaced open-pollinated varieties. Except for the late-maturing types, nearly all the leading varieties and hybrids have yellow kernels.

Many public research agencies and private companies breed and introduce new sweet corns. As a result, a large number of varieties and hybrids is grown. Some varieties and hybrids may be available for only a few years, being displaced by better ones.

Table 1 gives the more important features of some outstanding varieties.

Sweet corn variety tests are conducted every year in many States, and lists of recommended varieties may change annually. Table 2 indicates which of the varieties listed in table 1 appear best for growing for market in different areas of the country. The recommendations are based, chiefly, on tests conducted by State agricultural experiment stations.

The climate in some of the northernmost sections and in the Pacific Northwest is so cool that all varieties develop more slowly than in most other places where sweet corn is generally grown. For example, in the Upper Peninsula of Michigan nothing later than Golden Bantam can be grown. Rated as a 78-day variety under average conditions, Golden Bantam requires about 100 days in that section. Later varieties encounter frost before harvesttime.

In western Washington Carmelcross requires 100 to 120 days, although it is rated as a 77-day variety; Golden Cross Bantam may require up to 130 days in some localities of the section. Such effects of climate should be kept in mind in using table 1 and table 2.

SOIL MANAGEMENT

Good soil management is necessary to maintain or improve soil fertility and to prevent erosion.

Erosion may also be prevented by plowing and planting on the contour if the land is steeply sloping and by stripcropping and terracing on slopes steep enough to need such measures.

Crop Rotation

Sweet corn fits well into most crop rotations or cropping sequences. It should be grown only once in 3 or 4 years on the same field.

On farms producing livestock or dairy products, sweet corn may be grown in rotation with hay, pasture, small grains, or legumes. On farms where vegetables are grown for processing, it can fit into cropping sequences that include such crops as snap beans, lima beans, peas, tomatoes, pumpkins, squash, cabbage, and potatoes.

TABLE 1.—*Some of the principal features of some sweet corn hybrids and varieties commonly grown in the United States*

Variety or hybrid	Kernel color [2]	Time to harvest	Ear length	Rows of kernels	Plant height
		Days	*Inches*	*Number*	*Feet*
SMALL TO VERY SMALL EARLY KINDS, 65 TO 74 DAYS TO HARVEST [1]					
Earliking	Y	66	7½	12	5½
Golden Beauty	Y	69	7½	12 to 14	5½
Golden Rocket	Y	67	7	10 to 12	5
Marcross	Y	74	7½	10 to 14	5½
North Star	Y	70	6½	8 to 12	5½
Seneca Dawn	Y	70	7½	12 to 16	5
Seneca Golden	Y	72	7	12	5½
Seneca 60	Y	67	6½	10 to 12	4½
Spancross	Y	70	6½	10 to 12	5½
Spring Gold	Y	67	7	12 to 16	5
SMALL EARLY KINDS, 75 TO 80 DAYS TO HARVEST [1]					
Carmelcross	Y	77	7	12 to 14	5½
FM Cross	Y	80	7	14 to 16	6
Golden Bantam [3]	Y	78	6½	8	5½
Gold Rush	Y	77	7	12 to 14	6
Northern Cross	Y	77	7	10 to 14	6½
Sugar King	Y	78	7½	14 to 16	6½
MEDIUM TO LARGE MIDSEASON KINDS, 81 TO 89 DAYS TO HARVEST [1]					
Aristogold Bantam Evergreen	Y	87	9½	16 to 18	7
Calumet	Y	86	9	12 to 14	7
Golden Bounty	Y	83	9	12 to 14	7½
Golden Cross Bantam	Y	85	8	10 to 14	6
Golden Security	Y	85	8	14 to 16	7½
Ioana	Y	87	8	12 to 14	6½
Iobelle	Y	86	8	14 to 16	7½
NK 199	Y	84	7½	18 to 20	7½
Merit	Y	84	8	16 to 20	7
Seneca Chief	Y	85	9	12	6½
Seneca Wampum	Y	89	8	14 to 16	7½
LARGE LATE KINDS, 90 DAYS OR OVER TO HARVEST [1]					
Country Gentleman	W	95	7	(4)	7
Country Gentleman (Ill.) No. 13	W	97	7½	(4)	7½
Honey June [3]	W	105	8	12 to 18	9
Iochief	Y	90	9	14 to 18	7
Iogreen	W	95	7½	20 to 26	8
Silver Queen	W	92	8½	14 to 16	7½
Stowell Evergreen [3]	W	95	8	16 to 20	8½

[1] Days to harvest are the approximate number of days from planting to harvest when planted about the frost-free date in a region or season having a monthly mean temperature of 70° to 75° F. during most of the growing season. Mean growing season temperatures as low as 65° will increase the time to harvest by about 15 to 20 days for most varieties.

[2] Y indicates yellow kernels; W, white.

[3] Open-pollinated variety.

[4] Nonrowed variety.

TABLE 2.—*Some sweet corn varieties recommended for growing for market in various areas of the United States, 1965*

Area	Some varieties recommended
New England [1]	Marcross, Carmelcross, North Star,[2] Northern Cross, Golden Rocket, Golden Cross, Bantam, Ioana, Seneca Chief, Earliking.
Middle Atlantic [3]	Carmelcross, Golden Cross Bantam, Ioana, Iochief, Golden Security, Stowell Evergreen hybrid, Country Gentleman, Country Gentleman hybrids.
South Atlantic	Aristogold Bantam Evergreen, Golden Cross Bantam, Ioana, Golden Security, Iobelle, Seneca Chief,[2] Merit.
Florida	Silver Queen, Golden Cross Bantam, Ioana, Golden Security, Seneca Chief, Iobelle.
East North Central [1, 3]	North Star, FM Cross, Golden Cross Bantam, Seneca Chief, Ioana, Marcross, Spring Gold, NK 199, Sugar King, Seneca Dawn, Golden Rocket, Earliking.
East South Central	Aristogold Bantam Evergreen, Golden Cross Bantam, Golden Security, Ioana, Iobelle, Seneca Chief,[2] Merit.
West North Central [1]	North Star, Golden Beauty, Spring Gold, FM Cross, Golden Cross Bantam, Sugar King, Seneca Chief,[2] Ioana, Carmelcross, Earliking.
West South Central	Ioana, Golden Cross Bantam, Iochief, Aristogold Bantam Evergreen.
Mountain [1, 3]	Carmelcross, Seneca Golden, Golden Cross Bantam, Ioana, Marcross.
Pacific Northwest	Spancross, Golden Rocket, North Star,[2] Carmelcross, Seneca Chief, Golden Cross Bantam,[2] FM Cross.
California	Golden Cross Bantam, Seneca Chief,[2] Carmelcross, Seneca Dawn, Golden Security.

[1] The earlier varieties shown are better adapted for the cooler districts of the area.
[2] Chiefly for home use and local market.
[3] The later varieties are adapted to the warmer parts of the area.

Sweet corn should not be planted after sod; it may suffer severe wireworm injury.

The best rotation or cropping sequence depends on many factors and must be worked out for each farm. County agricultural agents can advise on crop rotation systems.

Cover and Green-Manure Crops

It is not possible to give specific instructions for growing cover and green-manure crops; there is too much variation in conditions under which sweet corn is grown. In general—

- If the soil is subject to erosion or leaching, protect it with a cover crop as much of the time as possible—never fail to provide a cover for such soils over winter.
- Grow a green-manure crop for turning under every year or two unless 10 tons or more of manure per acre is applied at similar intervals. (Heavy natural weed cover may help serve the same purpose if plowed down before the weeds go to seed.)

Some general recommendations follow:

Northern part of the country.—Rye or wheat sown at 1½ to 2 bushels per acre at the last cultivation of sweet corn.

Central part of the country.—Rye or wheat sown at 1½ to 2 bushels per acre in September or October; rye and hairy vetch mixed (1½ bushels of rye and 1 peck of vetch per acre), sown in late August or early September; or crimson clover sown at 20 to 25 pounds per acre from August to October in the States along the Atlantic coast. Crimson clover requires a well-prepared seedbed.

Southern part of the country, after spring sweet corn.—Cowpeas or soybeans sown at 1½ to 2 bushels per acre.

Southern part of the country, before spring sweet corn.—Hairy vetch or smooth vetch sown at 20 to 30 pounds per acre in September; Austrian Winter peas sown at 30 to 40 pounds per acre in September; crimson clover or annual white sweetclover sown at 15 to 20 pounds per acre on well-limed soils in September to November; Southern burclover sown at 50 to 60 pounds in September.

Florida and districts near the Gulf of Mexico.—Hairy indigo as a summer legume sown at 6 to 10 pounds per acre in March or April. Lupine as a winter legume sown at 60 to 90 pounds per acre in October or November.

Fertilizing

Available plant nutrients are especially important early in the life of the sweet corn plant. If the corn does not make a rapid, uninterrupted start, yield will be reduced.

Commercial fertilizers, applied with or without manure, profitably increase yields on most soils. In general, moderate applications of fertilizer supplemented by 10 to 12 tons of manure per acre are better than heavy applications of fertilizer or manure alone. Manure should be supplemented with the equivalent of about 40 pounds of superphosphate per ton.

Fertilizer recommendations for sweet corn differ from State to State and from one soil type to another. Specific recommendations may be obtained from county agricultural agents. Some examples of common fertilizer practices are:

- On the very light, sandy soils of the Atlantic and Gulf Coastal Plains, broadcast 1,000 to 1,200 pounds per acre of 4–8–6 and work it into the soil before planting. Top dress with 150 to 200 pounds per acre of the same fertilizer when the crop is about 8 inches high, and again when it is 15 to 18 inches high. (These high rates are recommended only if little or no manure is available.)
- On soil of average fertility in the Northeast, 600 to 800 pounds per acre of 5–8–5 broadcast and 400 to 500 pounds in band application.
- In the more fertile valleys of the West and Pacific Northwest and on the better soils of the Corn Belt, 5–10–5 applied in bands at planting time at these rates: 300 to 500 pounds per acre if manure has

been added, 400 to 700 pounds without manure.

Broadcast applications of fertilizer are usually put on the soil after plowing and worked in by disking and harrowing. Applications made before plowing or placed on the furrow bottoms during plowing have not given results as good as the more conventional applications.

Band applications are made with a combination planter and fertilizer distributor that places the fertilizer in bands about 2 inches to the sides of the rows of seed and about an inch deeper than the row of seed.

PLANTING

Soil Preparation

Proper seedbed preparation enables the plants to make the kind of start necessary for a full, uniform stand at harvest. Prepare a deep, firm seedbed that is free of clods, trash, and surface irregularities.

Moderately heavy to heavy soils not subject to erosion may be plowed in the fall and left rough over winter. When plowed in the fall, such soils can be worked and planted earlier in the spring. Light soils subject to leaching and all soils subject to erosion should be kept covered over winter and plowed early in spring.

Stubble or cover or green-manure crops that precede sweet corn should be plowed under deeply and the soil disked 3 or 4 weeks before planting. This allows time for partial decomposition of the material so it will not interfere with final soil preparation or with operation of the planter. Disk and harrow as many times as necessary to prepare a uniform seedbed and to keep weeds under control.

If your farm is in an irrigation district, follow recommendations for your district for final preparation before planting.

Time of Planting

Plant sweet corn after the soil has become warm and there is little or no danger of frost. In general, crops for processing and for the main market may be planted 10 days to 2 weeks after the average date of the last killing frost.

Market gardeners who strive for the earliest market plant part of their acreage only a few days to a week after the average date of the last killing frost if the weather appears favorable. Low temperatures this early in the season may cause poor germination, retarded growth, and loss of seedlings. However, early planting is usually worth the risk—if warm weather continues, the crop may be marketed several days before heavy marketing begins. If cool weather does cause injury, another planting can be made promptly.

Two methods are used to extend the length of the harvest period:

- Making successive plantings at intervals of a week or less.
- Planting early, medium, and late varieties at one time.

In the southern part of the country the best adapted varieties do not differ greatly in the time re-

quired to reach maturity, so successive plantings are the best way to extend the harvest season.

In the middle part of the country, either method may be used.

In the northern part of the country the simultaneous planting of early, medium, and late varieties is preferred. In the North, the season is not long enough to permit a wide range of dates for planting late varieties. Late plantings of early varieties are less productive than earlier plantings of later varieties.

Rates and Systems of Planting

Planting seed singly in drills is preferred to the check-row system of planting three or four seeds in hills. The machines and herbicides now available for weed control have decreased the need for cross cultivation.

Recommended planting rates run as high as 16,000 to 17,000 plants per acre for medium-sized varieties, such as Golden Cross Bantam, and 20,000 or more plants per acre for small, early varieties. These rates require 12 to 14 pounds of seed per acre.

Recommended spacings for drilled corn are listed below. The first figure indicates distance between rows, and the second figure indicates distance between plants in the row. Table 1 (p. 5) gives information on plant sizes.

- Very small, very early varieties: 30 by 8, or 30 by 9 inches.
- Small, early varieties: 30 by 10, 32 by 10, or 32 by 12 inches.
- Medium-sized varieties: 32 by 12, 32 by 14, or 36 by 12 inches.
- Large varieties: 36 by 14, or 40 by 12 inches.
- Very large, late varieties: 42 by 12, or 42 by 14 inches.

For hills in checkrows, three or four plants per hill are best, with the hills spaced about 32 by 32 inches for small varieties, 36 by 36 for medium varieties, and 40 by 40 for large varieties.

Precise planting of seed is essential for a full stand of uniform plants. Such growth is important for large plantings of corn for market or for processing that must be harvested on schedule. To plant the desired quantity of seed at the proper spacing, you need—

1. Seed that has been "sized," or graded for uniformity of size.
2. A dependable planter, with planter plates designed for the seed size and the desired rate of planting.

Use of sized seed is not essential for small plantings of market corn.

Depth of Planting

Planting too deep is a common error; seed should be planted only deep enough to place it in moist soil below the dry surface layer.

In loamy, silty, or other heavy soils the depth should be not more than 1 inch, although the soil at that depth may appear somewhat dry at planting time. More than 1 inch of soil over the seed may interfere with germination and emergence if hard rains pack or crust the soil before emergence.

In sandy loams 1½ inches is a good planting depth. In very light or sandy soils that dry out quickly

and are not packed by rains, the seed should be placed about 2 inches deep. Seedlings can push through 2 to 2½ inches of very light soils without harm.

REPLANTING

Plants that start growth late rarely, if ever, catch up with plants that start early. The larger plants tend to crowd the laggards, which may produce nothing. For this reason replanting the "skips" or missing hills by hand after the sweet corn is up and growing is not recommended.

Trying to "patch up" a poor stand usually is futile. If a stand is very poor, it is usually better to replant entirely.

IRRIGATING

Humid Areas

In the humid eastern half of the country there is usually enough moisture for sweet corn to make normal growth up to the silking stage. After that time rainless periods in about half of the years are likely to be long enough to interfere with growth on light soils of low moisture-holding capacity.

Even in areas where the average annual rainfall is from 35 to 50 inches and the warm-season rainfall is from 21 to 30 inches, supplemental irrigation of market sweet corn is profitable. This is true especially in sections of the Atlantic and Gulf Coastal Plains that have soils with a low water-holding capacity. On such light soils, sweet corn should receive the equivalent of about an acre-inch of water every week, either as rainfall or irrigation.

Yield increases in irrigated corn are greater on soils well supplied with organic matter. The percentage of marketable ears also is higher on soils well supplied with organic matter.

Supplemental irrigation appears profitable for market sweet corn on the heavier soils in areas where rainless periods of 2 weeks or more are likely to occur.

Prices normally received for corn for processing will hardly justify the cost of sprinkling equipment in the so-called humid areas having reasonably well distributed rainfall.

Since irrigation is not needed every year in the eastern half of the country, a permanent irrigation system is not justified for growing sweet corn. Portable sprinkler systems that can be moved from field to field, however, may be profitable. Of course, a cheap and dependable supply of water must be available close to the field.

Furrow irrigation is preferred over the rotary sprinkler system during the critical kernel development stage, because it distributes the water more evenly, does not disturb the pollen during the earlier growth, and is less apt to damage individual plants. Also, furrow irrigation is a suitable method when a general wetting of a field crop is

inadvisable, and it aids in accurate fertilizer placement. Proper leveling of the field can be expensive and difficult without suitable equipment.

Many factors must be taken into account in determining whether irrigation is likely to be profitable.

Irrigated Districts

In the irrigated districts of the West, sweet corn produces very high yields under good management in favorable locations.

Irrigation practices may differ widely from one district to another. Therefore, details of the different methods used are not given here. But regardless of the surface method used, it is recommended that at each irrigation small streams be run in the furrows until the water soaks down to a depth of 1½ to 2 feet. A few thorough soakings are better than frequent light applications.

WEED CONTROL

Many weeds, including pigweed, lambsquarters, ragweed, smartweed, jimsonweed, cocklebur, morningglory (or bindweed), and annual weed grasses, infest sweet corn fields. In many areas, quackgrass and nutsedge (or nutgrass) are serious problems. Most of these weeds can be controlled by cultivation, by chemical weed control, or by a combination of both.

Flame weeding is not recommended for sweet corn because it may injure the crop.

Cultivation

The main purpose of cultivation is weed control. But cultivation can also break the crust on fine-textured, poorly granulated soil that has become compacted or sealed at the surface. Breaking the crust permits better water intake and better aeration and may aid emergence of the crop seedlings.

Weeds are easiest to kill by cultivation when very small; delay reduces the effectiveness of cultivation.

There is usually little advantage in cultivating sweet corn after it is 18 to 24 inches tall if weeds have been kept under control by earlier cultivations and the stand provides adequate and uniform shade.

Easy-to-work soil

In friable, easy-to-work soil, use a spike-tooth harrow, spring-tooth weeder, or rotary hoe for early cultivations—up to the time the corn reaches the five-leaf stage of growth.

Cultivate shallowly with the implements to avoid bringing deeply buried weed seed up near the surface where they can germinate. Implements have little effect on well-established perennial weeds or on annuals such as the cocklebur that germinate well below the soil surface.

The rotary hoe is most effective if used when the weed seedlings have emerged and the soil has a dry crust. Rotary hoeing under these conditions exposes the weed roots to drying, which kills the weeds.

This implement is best for breaking crust on the soil surface.

Between the five-leaf stage of growth and the time when the corn becomes 18 to 24 inches high, use a shovel cultivator as often as necessary to control weed growth. The "duck foot" sweep cultivator, which runs nearly flat under the surface, is the best type to use.

Hard-to-work soils

If a cultivation is necessary between planting and the emergence of crop seedlings in soils difficult to work, use one of the three implements recommended for easily worked soils. Use a shovel cultivator for all other cultivations.

Make the first postemergence cultivation before corn reaches the five-leaf stage of growth. Use a shield on the cultivator to prevent burying the small plants, and travel at a slow speed.

Make the later cultivations (up to the time corn becomes 18 to 24 inches high) as frequently as necessary for good weed control.

Cultivate just deep enough for weed control. Gouging down as deep as 4 inches damages sweet corn roots after the plants are past the seedling stage. Furthermore, the crop does not benefit from a higher ridge of soil in the row—the ridge need only be high enough to cover the weeds.

The "duck foot" sweep-type shovel cultivator cannot be kept in hard soil, except with heavy tractor cultivators.

Pairs of disks (disk hillers), one on each side of the sweet corn row, in combination with sweeps are highly effective for late cultivations, for controlling vine weeds, and for cultivating trashy soil.

SUCKERING

The removal of suckers, or tillers, from sweet corn plants is not worthwhile. In the Eastern States, delayed suckering has reduced yields. In the West, there may be no harmful results, but suckering is not profitable.

Chemical Weed Control

Preemergence treatment

Weeds that emerge with corn may overgrow the crop before it is tall enough for effective cultivation. The problem can be especially severe if early season rains prevent cultivation—plantings may be lost or so severely damaged by weed competition that yields are greatly reduced.

Early-season weeds may be controlled by preemergence treatment with atrazine or amine salts of DNBP. Apply atrazine at the rate of 2 to 4 pounds per acre, or amine salts of DNBP at the rate of 6 to 9 pounds per acre, immediately after planting. The herbicide may be broadcast in either spray or granular form. Band treatments over the row are often used to reduce cost and minimize atrazine residues in the soil. Early and repeated cultivation between rows is necessary when band applications of herbicides are used.

CAUTION: Do not use atrazine on sweet corn when broad-leaved

vegetables will be planted in rotation in the same season. Atrazine may have a prolonged residual effect in the soil, particularly if the granular form is used in dry seasons.

Preemergence treatment with atrazine or amine salts of DNBP will control most annual weeds for 1 to 2 months. Control late-emerging weeds by cultivation.

Postemergence treatments

Dense populations of broad-leaved weeds such as pigweed and lambsquarters that emerge with the corn may require a broadcast spray of 2,4–D during the early stages of growth.

Some broad-leaved weeds emerge during midgrowth of the crop and become established in the row where they are not reached by mechanical cultivation. Directed sprays of 2,4–D (amine salt) at a rate of ¼ pound per acre will control a number of these weeds, including morningglory, jimsonweed, ragweed, and smartweed. Direct the spray into the row below the crowns of the corn plants. Weed grasses are not controlled by this treatment.

Certain weeds are stunted but not killed by 2,4–D. Stunting the growth of some weeds removes them from active competition with the corn and is as effective as killing them. Increasing the 2,4–D treatment rate to obtain sudden and complete kill of all weeds usually causes brittleness of the corn stalks and distorts growth, resulting in wind damage and reduced yields. The rates and methods of treatment should therefore be precise.

Special weed problems

Nutsedge may be controlled under some conditions by applying atrazine at a rate of 4 pounds per acre. Apply the herbicide in either spray or granular form just before or immediately after planting. The treated land should be deep plowed before a cover crop is planted. Corn should be grown on the land, without atrazine, in the following year to minimize atrazine residual problems in the soil. This method should be used only when the nutsedge problem is critical.

Common, Chemical, and Trade Names of Herbicides

Accepted common name	*Chemical name*	*Trade name*
atrazine	2-chloro-4-ethylamino-6-isopropylamino-*s*-triazine	Atrazine
DNBP	alkanol, ethanol, or isopropanolamine salts of 4,6-dinitro-*o*-*sec*-butylphenol	Dow Premerge Sinox PE
2,4–D	Amine salt of 2,4-dichlorophenoxyacetic acid	2,4–D
EPTC	Ethyl *N*,*N*-dipropylthiol carbamate	Eptam

Trade names are indicated here solely for the purpose of providing specific information. Mention of a trade name does not constitute a guarantee or warranty of the product by the U.S. Department of Agriculture or an endorsement by the Department over other products not mentioned.

Quackgrass cannot be effectively controlled by mechanical cultivation. To control the weed, apply atrazine at a rate of 2 pounds per acre before fall plowing or 2 to 3 weeks before spring plowing. After the land is treated and plowed, it should not be worked until planting time. The usual preemergence atrazine treatment of 2 pounds per acre should be made at planting time for annual weed control.

HARVESTING

Time

Sweet corn should be harvested when the kernels are in the milk stage. At this stage the silks are brown and dry beyond the end of the husks and the kernels have developed enough size for the ear to fill the husks snugly well out toward the tip. The husks feel tightly fitted about the ear. The kernels are almost as large as they will become, but they are still soft and tender, and are filled with a thick, opaque, milky juice.

If the ears are harvested when the kernels are filled with a thin and watery or only cloudy or translucent liquid, the edible portion per ear will be low and it will lack the desired rich body and flavor. If har-

Well-filled-out ears of sweet corn.

vest is delayed until the kernel contents become semisolid or doughlike, most of the sweetness will be gone and the skins, or coats, of the kernels will be tough.

Fortunately, the best quality occurs at the time when the largest yield of fresh kernels is obtainable. Delaying harvest beyond the best stage will not give any worthwhile increase in weight of edible corn. Beyond that stage the kernels and entire ear begin to lose water about as fast as solid matter develops, and loss of eating quality is rapid.

Sweet corn for processing must meet rather strict standards of uniformity and composition. Processing companies and other large growers use instruments and growth data to determine maturity and the best time to harvest the corn.

Market sweet corn is commonly hand harvested on the basis of external appearance and "feel." This method is less precise, but satisfactory with experienced pickers.

Methods

Sweet corn is harvested by hand and by machine. By either method, harvest as much of the corn as possible in the early morning when temperatures are cool. High temperatures quickly lower the eating quality of harvested ears. Never leave them in piles, on vehicles, or on loading platforms where they can become heated.

Hand harvesting

Sweet corn is hand harvested as follows:

Break the shank, or stem of the ear, as close to the ear as practicable without breaking the main stalk or tearing the entire shank from the stalk. Grasp the ear near its base and bend it sharply downward or to one side with a rotary motion of the wrist. At first, it may be necessary to hold the stalk or the shank with one hand to break ears off properly. With practice, the ears of most varieties can be snapped off with one hand.

In small-scale operations, the pickers carry a bag or other container which they empty into containers or a vehicle at the ends of the rows. In large-scale operations in which a highly uniformed field is harvested only one time, the ears are thrown directly into a vehicle driven alongside the pickers.

Sweet corn for processing is usually picked and loaded directly into the vehicle in which it is delivered to the factory. Corn for market is usually hauled to a central point on the farm or to a packinghouse, where it is prepared for market.

In some areas where sweet corn is grown for direct shipment to fresh market outlets, mobile "packinghouses" are sometimes used. The corn is trimmed and crated right in the field.

Machine harvesting

Since sweet corn grown under contract for the canner or freezer is harvested and handled under the direction of company fieldmen, there is no point in going into detail here. It is noteworthy, however, that the mechanical sweet corn

harvester is being improved each year and is being used increasingly. Probably more than half the crop for processing is machine harvested.

The mechanical harvester is much faster than hand harvesting and can be operated at night to take advantage of cooler temperatures. While it picks culls that must be thrown out at the factory, it does not miss many good ears, as hand pickers sometimes do. It causes some ear damage, but this is offset by the saving in labor costs.

A uniformly maturing crop is essential for successful use of a mechanical picker. A field can be picked only once because the machine mangles or cuts up the plants.

Handling Harvested Corn

Heat causes loss of quality in harvested sweet corn. At 86° F., half the sugar in the kernels is lost within 24 hours after harvest. The loss is greater at higher temperatures and less at lower temperatures. If the harvested corn is thrown into large piles or tightly packed without adequate cooling, it can heat up enough to be ruined within a few hours.

Sweet corn for processing is usually delivered to the processing plant within a few hours after it is harvested, receiving no special treatment or handling. In hot weather, quick delivery is essential to prevent loss of quality.

If market corn can be harvested at the break of day, kept out of the sun, and rushed to the consumer before noon, no icing or refrigeration is usually necessary. But if the corn will be held more than a few hours before use, effective cooling immediately after harvest is essential. Cooling methods used in-

Mechanical sweet corn harvester.

clude packing in iced cars and hydrocooling.

For information on handling market corn, consult your State agricultural experiment station or write to the Market Quality Research Division, Agricultural Research Service, U.S. Department of Agriculture, Hyattsville, Md. 20781.

DISEASES

Root rots cause heavy losses in sweet corn, especially in field-corn regions. A crop may be infected by diseased seed or by rot-producing fungi in the soil. Damage includes reduced yields, irregular growth and maturity, barren stalks or stalks that bear nubbin ears, or premature death. Seed should be treated for protection against root rot diseases before planting. Rotating crops and keeping the soil in a highly fertile condition will reduce damage if the soil becomes infested.

Smut, a widely distributed disease, is caused by a fungus. The fungus infects the stalks, ears, or tassels at any stage of growth, producing ugly outgrowths. Seed treatment is ineffective. Crop rotation helps reduce infections.

Ear rots are caused by several fungi. Infected ears develop imperfectly and are soft and often have a moldy appearance. The ear rots, which usually appear late in the season, are important chiefly where sweet corn is grown for seed. They are most serious in moist, warm weather. Control measures include rotation, clean cultivation, and the use of disease-free seed of disease-resistant strains.

Bacterial wilt, or Stewarts disease, is the most important bacterial leaf disease of sweet corn. It occurs to some extent almost every year in the Middle Atlantic States.

Detailed information about corn diseases may be obtained from your county agricultural agent, State agricultural experimental station, or the U.S. Department of Agriculture, Washington, D.C. 20250.

INSECTS

Many species of insects attack and damage sweet corn. Among the more important ones are the corn earworm, the European corn borer, common cornstalk borers, webworms, the armyworm, the chinch bug, the corn flea beetle, the corn leaf aphid, sap beetles, the corn root aphid, white grubs, the Japanese beetle, leafhoppers, grasshoppers, wireworms, the seed-corn maggot, and corn rootworms.

For information on the control of insects that infest sweet corn, consult your county agricultural agent or your State agricultural experiment station, or write to the U.S. Department of Agriculture, Washington, D.C. 20250.

PRECAUTIONS

Herbicides are poisonous to man and animals, and can damage crops if improperly used. Follow the directions and heed all precautions on the container label.

Use herbicides only on the crops for which they are intended and at the recommended rates. Labels include a list of the crops that may be safely treated. Geographic restrictions are given on the labels for some herbicides.

Keep herbicides in closed, well-labeled containers in a dry place. Store them where they will not contaminate food or feed, and where children and animals cannot reach them.

When handling a herbicide, wear clean, dry clothing.

Avoid repeated or prolonged contact of herbicide with your skin.

Wear protective clothing and equipment if specified on the container label. Avoid prolonged inhalation of herbicide dusts or mists.

Avoid spilling herbicide concentrate on your skin, and keep it out of your eyes, nose, and mouth. If you spill any on your skin, wash it off immediately with soap and water. If you spill it on your clothing, launder the clothing before wearing it again.

After handling a herbicide, do not eat, drink, or smoke until you have washed your hands and face. Wash your hands and face and any other exposed skin immediately after applying herbicide.

To protect water resources, fish, and wildlife, do not contaminate lakes, streams, or ponds with herbicide. Do not clean spraying equipment or dump excess spray material near such water.

Avoid drift of herbicide to nearby bee yards, crops, or livestock.

Dispose of empty herbicide containers at a sanitary land-fill dump, or bury them at least 18 inches deep in a level, isolated place where they will not contaminate water supplies. If you have trash collection service, wrap small containers in heavy layers of newspapers and place them in the trash can.

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